Emerging Trends in Utility Cost Allocation

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Agenda

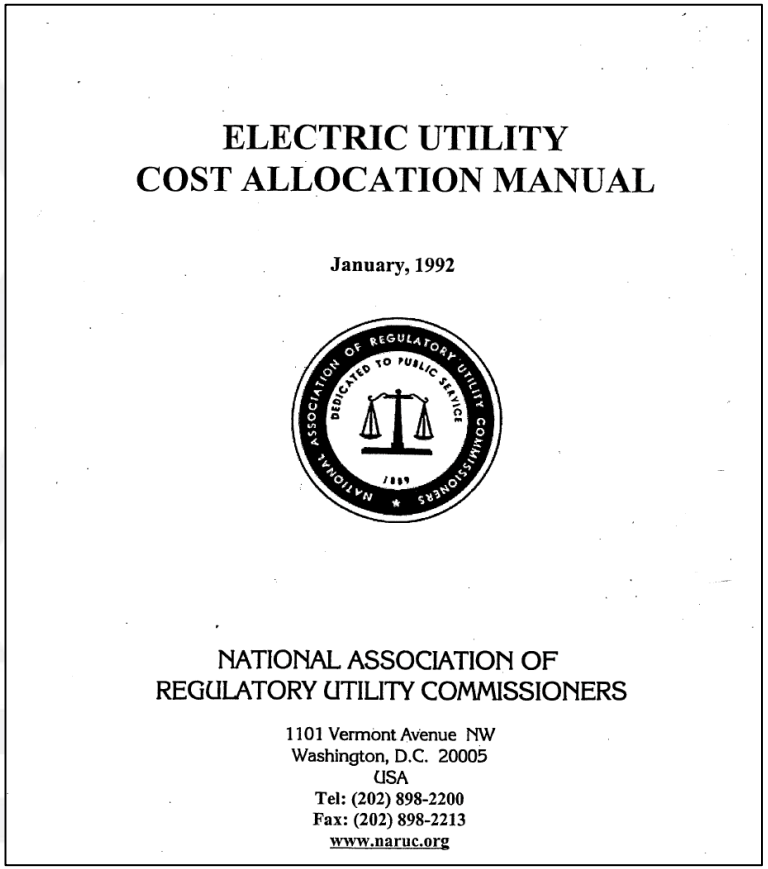
- Traditional cost allocation methods
- A changing landscape
- Time-based cost allocation
- Multi-use assets
- Electric vehicle (EV) charging
- Summary and key takeaways

What is cost allocation and why is it important?

- Cost allocation studies determine which customers are responsible for certain costs associated with operating the electricity system.
- The objective of cost allocation is to ensure that costs are allocated fairly and equitably.
  - Attribute costs to customers based on how utility costs are incurred or who benefits from the investment
- It is one part of the utility regulatory process.
  - It typically occurs after a cost-of-service study, which determines the utility's revenue requirement, and
  - Before a rate design study, which determines what and how customers will be charged.
- Together these studies ensure that customers are charged fairly, and utilities receive enough revenue to reliably operate the system.

Traditional methods of cost allocation

- The traditional cost allocation process is outlined in NARUC's Electric Utility Cost Allocation Manual (1992), which instructs utilities to:
  1. Decide on an embedded or marginal cost allocation process
  2. Assign costs to different utility functions (e.g., generation, transmission, distribution, administrative)
  3. Classify costs based on the rate structure (i.e., as a unit of energy, demand, or customer)
  4. Allocate costs to customer classes



ELECTRIC UTILITY
COST ALLOCATION MANUAL

January, 1992

NATIONAL ASSOCIATION OF
REGULATORY UTILITY COMMISSIONERS

1101 Vermont Avenue NW
Washington, D.C. 20005
USA
Tel: (202) 898-2200
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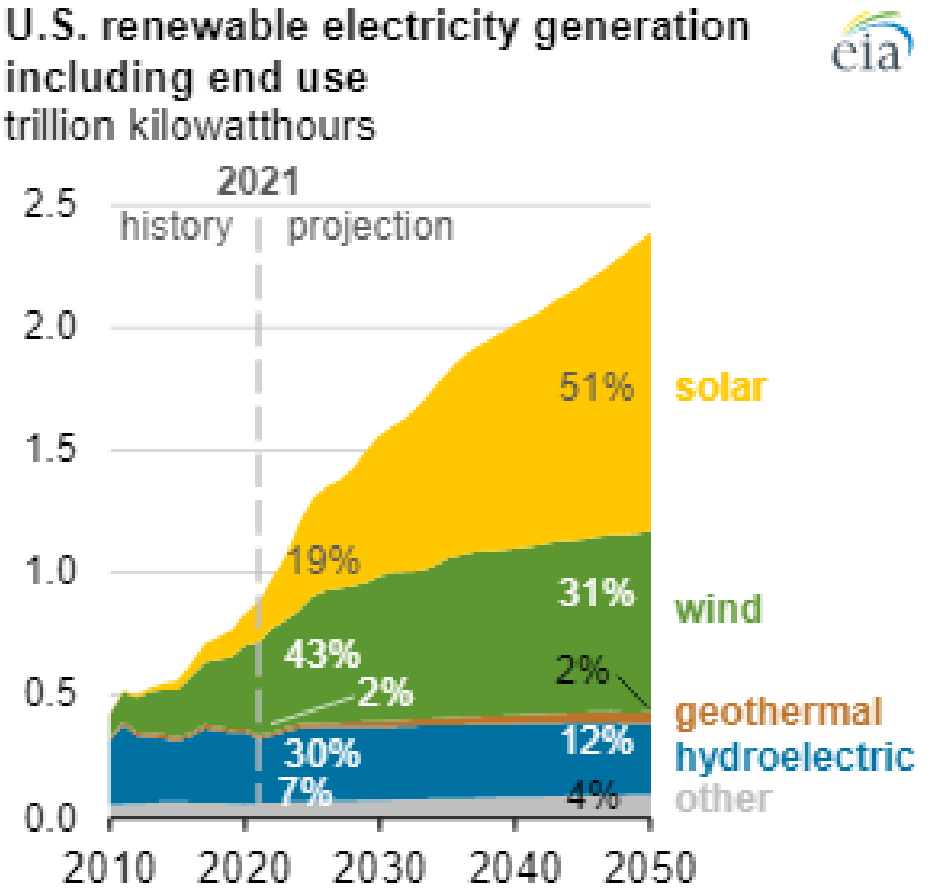
Changes in technology and regulation necessitate a change in cost allocation process

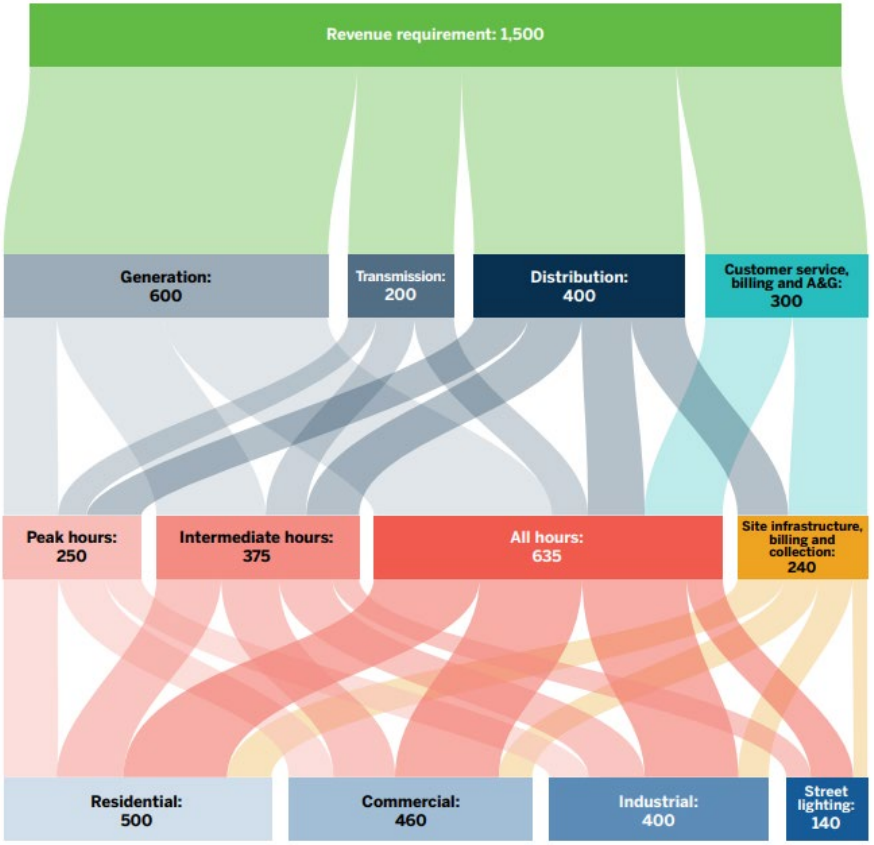
- Growth in renewables is changing how the grid is operating.
- Smart meters and distributed energy resources (DERs) provide for greater customer control and insights.
- Regulatory principles like performance-based regulation change how utilities are compensated.
- Energy storage has emerged as a flexible resource that can be used as a generating, transmission, or distribution asset.



Source: EIA, 2022

Hourly allocation

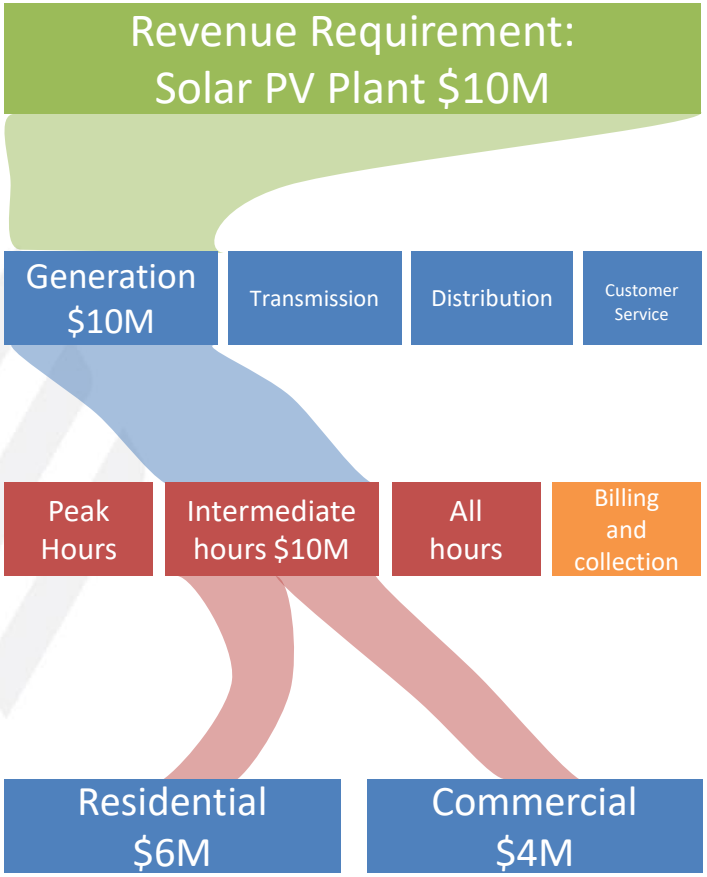
- In 2020, the Regulatory Assistance Project (RAP) published a guide to update analytical techniques for cost allocation.
- The key innovation is a focus on time assignment instead of a functional assignment.
  - Costs are assigned to operating periods where they are "used and useful."
- This helps align costs with peak usage and is more tailored to assets that serve multiple functions.
- Utility regulators should embrace a flexible approach for allocating costs.



Source: RAP, 2020

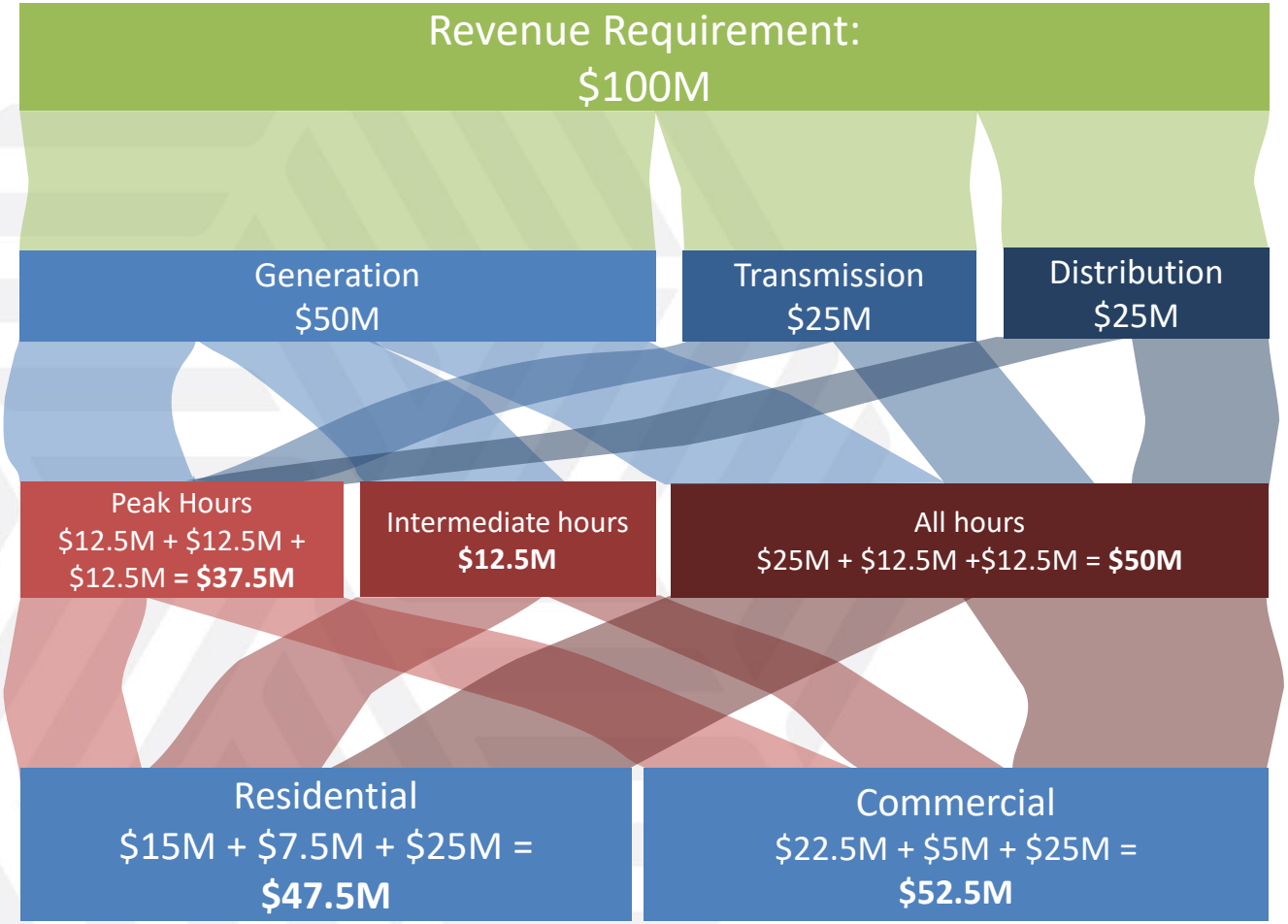
A simple example

- Consider a simplified use case with one generating asset and two customer classes.
  - Determine load requirements for customers
    - In this case, residential use accounts for 60% of intermediate hours and commercial use accounts for 40%.
  - Determine revenue requirement
    - In this case, one solar plant with $10 million in purchased power
  - Trace use of the plant through the allocation process
    - In this case, it's a generating asset, focused on intermediate hours
  - Allocate usage to each customer class



Adapted from: RAP, 2020

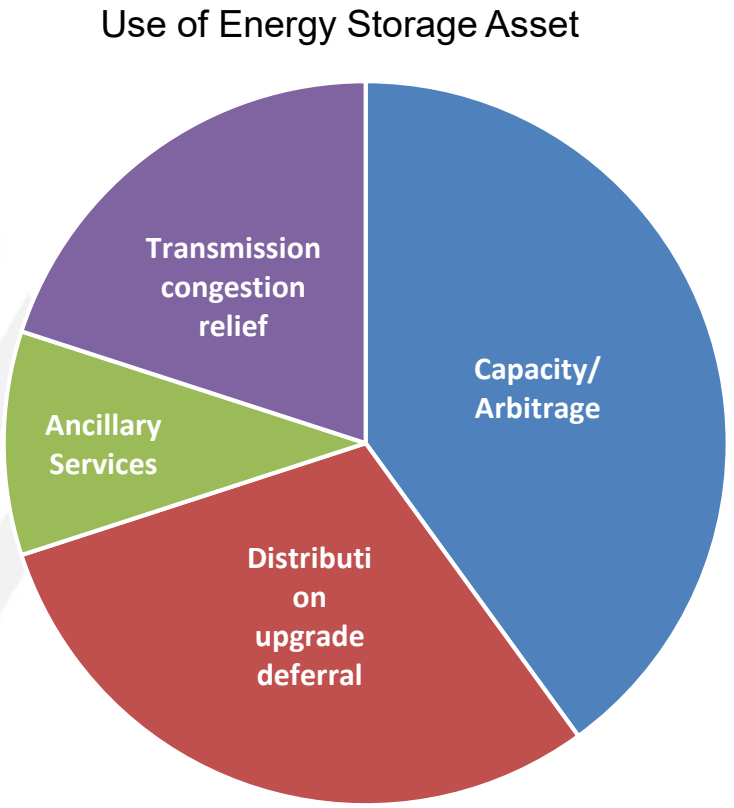
A more realistic example



Adapted from: RAP, 2020

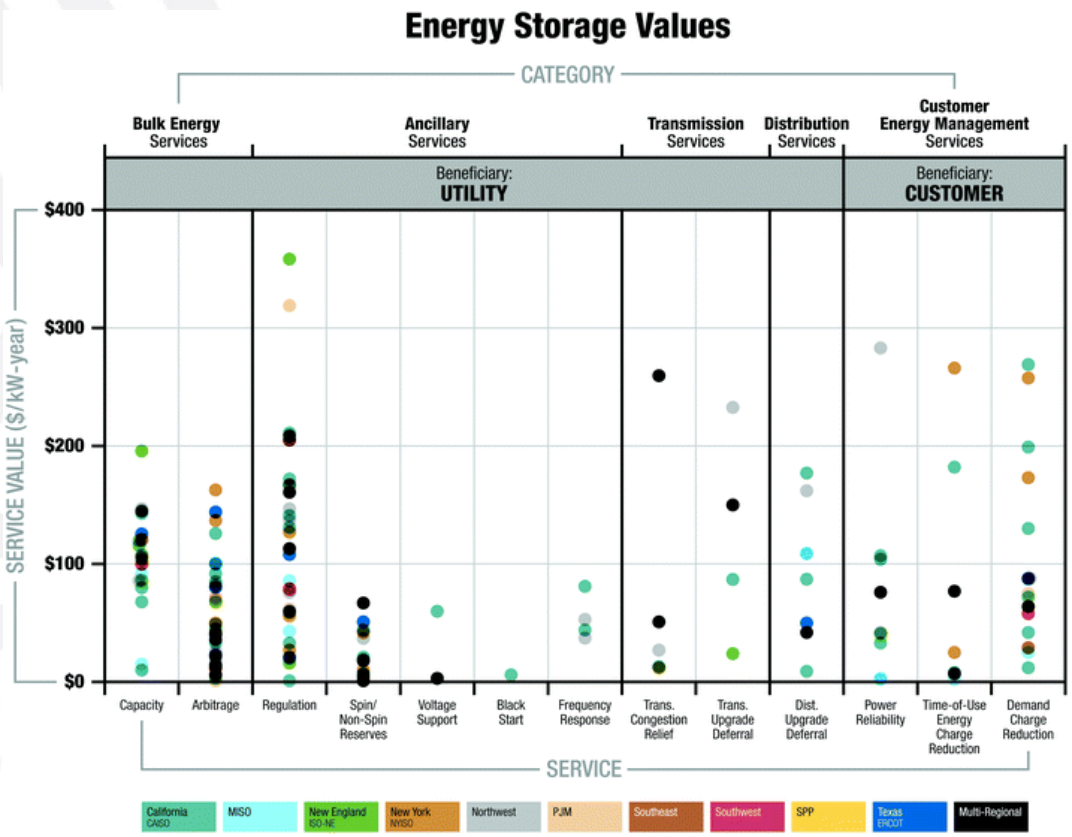
Energy storage and other multiuse assets

- Energy storage is more complicated to fit into a traditional allocation framework.
  - Can be energy related, demand related, or customer related depending on siting and use
- Regardless of approach, cost allocation should be dependent on how the asset will be used and who benefits from the asset.
  - Allocate multi-use assets proportionally.
  - Document the predicted uses of the asset as well as potential high value, low frequency uses of the project.
  - These uses are often more easily allocated in time of use frameworks than traditional methods.



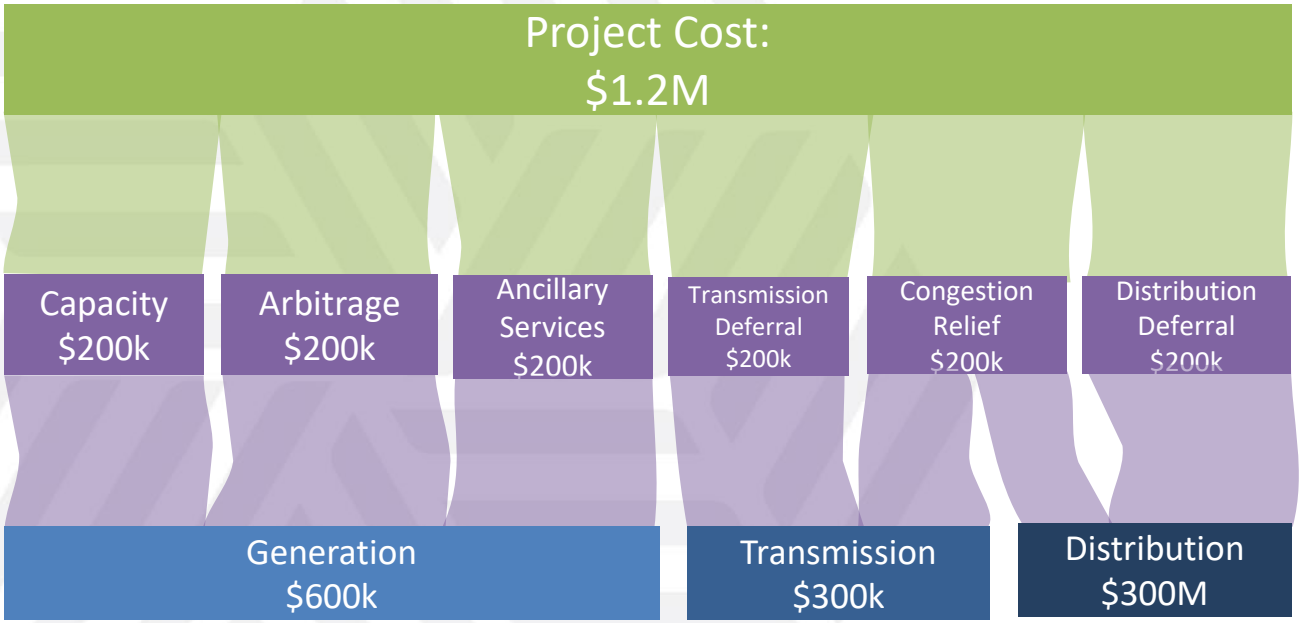
Value stacking for energy storage

- Value stacking exercises can help functionalize and trace the benefits of energy storage assets.
- PNNL provides examples and taxonomies for defining energy storage value.
- Analysts should consider all potential benefits (even those that may be unfamiliar) when allocating energy storage costs.



Source: Balducci, et al. 2018

From services to cost allocation



Adapted from: RAP, 2020

EV users as a separate asset class

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Home charging

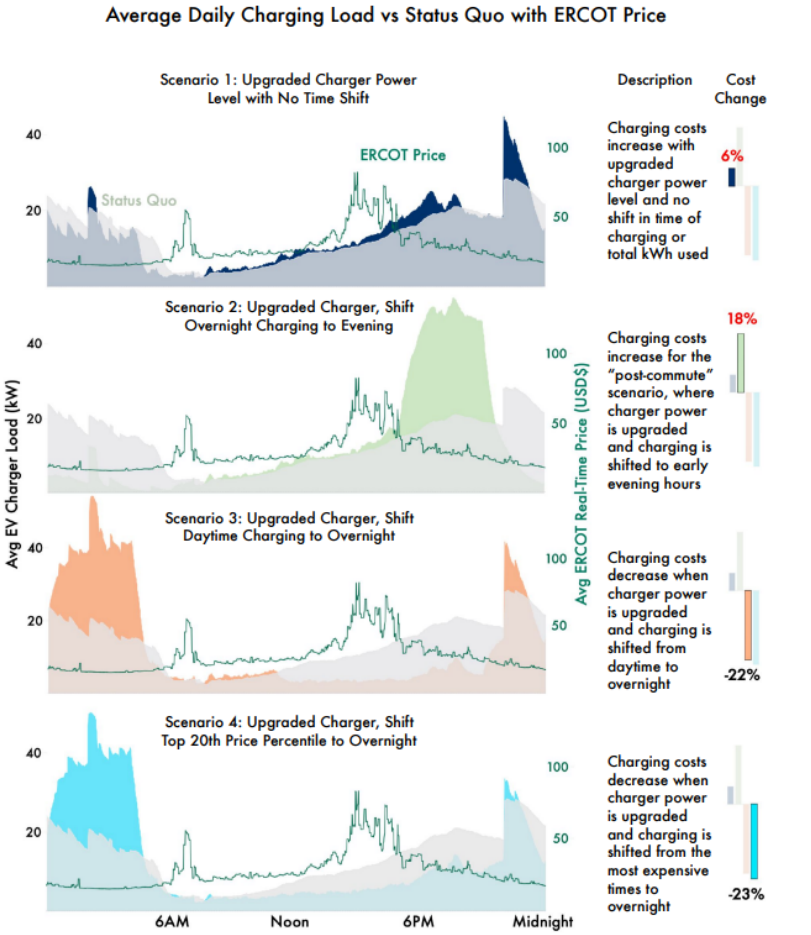
- Demand in line with other household appliances
- Load can be spread out over a broad period of time.
- Benefits and costs incurred by a residential user

Public charging

- Demand can be very high and sustained or variable.
- Load is less likely to be spread out or controllable.
- Costs are usually incurred by a commercial entity but benefit the commercial customer and EV end users.

Cost allocation and cost recovery for EVs

- Rate design is likely a better avenue to ensure equity from home charging.
  - EV chargers use less power than an electric water heater, and slightly more than an air conditioner (DOE, 2017).
  - Managed charging and time-based pricing have been effective in managing these impacts (SEPA, 2019).
- Public fast chargers are less straightforward.
  - Fast chargers sited with commercial and industrial customers on demand charges may not be substantially different than other commercial loads.
  - Dedicated public charging stations could warrant the creation of a separate customer class.



Source: Pecan Street, 2021

Questions public utility commissions can ask

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- Are you allocating costs based on causes or benefits? Is there a large difference between the two?
- Is it still worthwhile to allocate costs by demand and energy, or is a new approach warranted?
- Is a proposed new rate class large and distinct, or does the creation of a new class only impact a few customers?
- What objectives can be accomplished through the cost allocation process? Which objectives are better left for the ratemaking or system planning processes?
- Are you using smart meter data to understand customer load patterns and attribute causation and benefits?

Summary and key takeaways

- Cost allocation is subjective. There is not a single correct way to conduct the analysis.
- Consider comparing multiple frameworks and seeing if results are similar.
- Modern utility assets may be easier to allocate under a time-based framework, rather than a usage-based framework.
- For assets that have multiple use cases, allocate costs proportionally to causation or benefits.
- Be careful if creating new rate classes. Ensure that they are large and distinct.
- For EV charging, consider differences between commercial charging, public fast charging and home charging.
- Note that issues can also be addressed in the cost-of-service process and ratemaking process. Cost allocation does not have to solve every issue.
- Equity is a critical component of cost allocation, but it can also be addressed in other parts of the ratemaking process.

Resources for more information

- Balducci, Patrick J., M. Jan E. Alam, Trevor D. Hardy, and Di Wu. 2018. "Assigning Value to Energy Storage Systems at Multiple Points in an Electrical Grid." *Energy & Environmental Science* 11 (8)
- Balducci, Patrick, Jan Alam, Tom McDermott, Vanshika Fotedar, Xu Ma, Di Wu, Bilal Bhatti, et al. 2019. "Nantucket Island Energy Storage System Assessment." Pacific Northwest National Laboratory.
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Contact

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Thank you!

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